|  |  |  |  |
| --- | --- | --- | --- |
| Yes, Alloy |  | Weldability | Machinability |
| CCA617 |  |  |  |
| CF8C+ |  | Can be welded by SMAW, GTAW, GMAW methods |  |
| Inconel 740 |  |  |  |
| Inconel 625 |  | INCONEL alloy 625 is readily joined by conventional welding processes and procedures. GMAW methods | Can be machined |
| Inconel 718 |  |  |  |
| Nimonic 263 |  | NIMONIC alloy 263 is readily welded by automatic and manual T.I.G. processes and by M.I.G. processes. Resistance spot, stitch and seam welding techniques are in regular use on NIMONIC alloy 263 components. |  |
| Nimonic 105 |  | Fusion welding of NIMONIC alloy 105 using conventional processes such as T.I.G. or M.I.G. welding is not recommended as microfissuring can occur both in the weld and heat affected zones. Electron beam welding has been used successfully but the danger of microfissuring still exists and welding trials should always be carried out before the process is specified. Similar difficulties can be expected with resistance spot, stitch or seam welding. Flash-butt welding is, however, quite satisfactory and in regular use for the production of turbine rings. | NIMONIC alloy 105 should be in the fully heat-treated condition for all machining operations. The high hardness range, 320-385 HV, necessitates the use of tungsten carbide tipped tools. High speed steel shock-proof tools can be used if the cut is of an intermittent nature. |
| Nimonic 115 |  | The commonly used welding methods work well with this alloy. Matching alloy filler metal should be used. If matching alloy is not available then the nearest alloy richer in the essential chemistry (Ni, Co, Cr, Mo) should be used. | Conventional machining techniques used for iron based alloys may be used. This alloy does work-harden during machining and has higher strength and "gumminess" not typical of steels. |
| U700 |  |  |  |
| U710 |  |  |  |
| U720 |  |  |  |
| Waspaloy |  | Waspaloy, generally regarded as a material that is not readily weldable outside very carefully controlled circumstances, can be fusion welded by argon-arc methods using a matched composition filler metal. Heavy sections, thin sheet and tubing joints can all be made using non-consumable arc welding with a gas shield. The high-temperature strength of welds, after heat treatment, is lower than that of heat-treated, wrought material. Therefore, welds should be avoided at high-stress locations. | Waspaloy is among the more difficult of the superalloys to machine. |
| Haynes 230 |  | HAYNES® 230® alloy is readily welded by Gas Tungsten-Arc (TIG), Gas Metal-Arc (MIG) Shielded Metal-Arc (coated electrodes), and resistance welding techniques. Submerged-Arc welding is not recommended as this process is characterized by high heat input to the base metal and slow cooling of the weld. These factors can increase weld restraint and promote cracking. | HAYNES® 230® alloy is similar in machining characteristics to other solid-solution-strengthened nickel-base alloys. These alloys as a group are classified as a moderate to difficult to machine; however, it should be emphasized that they can be machined using conventional methods at satisfactory rates. As these alloys will work-harden rapidly, the keys to successful machining are to use slower speeds and feeds, and to take heavier cuts than would be used for machining stainless steels. |
| Haynes 282 |  | As a result of its high resistance to strain-age cracking, HAYNES 282 alloy is much more weldable than other alloys of similar strength. The preferred welding processes are gas tungsten arc and gas metal arc, using 282 alloy bare filler wire. Submerged arc welding (SAW) of HAYNES 282 alloy is not recommended due to the high heat input and  increased weld restraint associated with this process. | HAYNES 282 alloy has similar machining characteristics to other nickel alloys used at high temperatures. Rough machining should be carried out prior to age-hardening. Final machining or finish grinding may be done after age-hardening. |
| Inconel 617 |  |  |  |
| Haynes 263 |  | HAYNES®263 alloy has excellent forming and welding characteristics. The alloy can be welded by a variety of processes, including gas tungsten arc, gas metal arc, electron beam and resistance welding. High heat input processes such as submerged arc and oxyacetalyne welding are not recommended. |  |
| ODS-FeCrAl |  |  |  |